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SPECIFICATION

ION ELUTING UNIT AND DEVICE PROVIDED WITH SAME

5 Technical field

The present invention relates to a washer that is capable of sterilizing laundry and each portion of a washer such as a washing tub and the like by using metal ions exerting a sterilizing effect. Especially, it relates to a washer furnished with an ion eluting unit that produces metal ions by applying a voltage between electrodes.

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Background art

When laundry is washed in a washer, it is common to add a treatment substance to water, in particular, to rinsing water. Typical examples of such treatment substances include softening and starching agents. In addition to these, in recent years, the demand has been
15 increasing for treatment whereby laundry is subjected to antimicrobial treatment.

From the hygienic point of view, it is desirable to hang laundry in the sun to dry. However, in recent years, with the increase in the number of women who go to work, and with the increase in the number of nuclear families, there have been an increasing number of households where no one is at home in the daytime. In these households, there is no choice
20 but to hang laundry indoors to dry. Even in households where someone is at home in the daytime, in a rainy weather, there is no choice but to hang laundry indoors to dry.

As compared with hanging laundry in the sun to dry, hanging it indoors tends to promote growth of bacteria and mold in laundry. This tendency is marked particularly when it takes time to dry laundry, as when humidity is high, such as in a rainy season, or when

uneven spreading of laundry is detected during rotation of a washing tub for squeezing after metal ions are added.

In order to achieve the above object, according to the present invention, a washer, wherein antimicrobial metal ions can be added into water in a predetermined process in a laundry washing session, is so configured that a time of the predetermined process is longer
5 when metal ions are added than when no metal ions are added. It requires certain amount of time for the metal ions to fully attach to laundry. With this configuration, when the metal ions are added, the processing time is extended compared with the case where no metal ions are added, leading to satisfactory attachment of metal ions to laundry and exertion of their
10 expected antimicrobial effect.

According to the present invention, a washer, wherein antimicrobial metal ions can be added into water in a predetermined process in a laundry washing session, is so configured that the predetermined process includes a powerful swirl period and a mild swirl period or a powerful swirl period and a still period. It is not always necessary to agitate water strongly
15 in order to make the metal ions attached to laundry. With this configuration, aside from the powerful swirl period, the purpose of which is to make metal ions be dispersed uniformly into water and spread to every corner of laundry, there is a mild swirl period or a still period, the purpose of which is to quietly wait for attachment of metal ions to laundry, it is possible to avoid damages to the laundry cloth or increase in electricity consumption. Additionally,
20 generation of a mild swirl, rather than a still state, makes users notice that the washer is in operation, not malfunction.

According to the present invention, in the washer configured as described above, a ratio of powerful swirl period and mild swirl period or a ratio of powerful swirl period and still period is constant, regardless of a volume of water in a washing tub and/or an amount of

laundry. With this configuration, programming of control program is easy.

According to the present invention, in the washer configured as described above, a ratio of powerful swirl period and mild swirl period or a ratio of powerful swirl period and still period varies in accordance with a volume of water in a washing tub and/or an amount of laundry. With this configuration, it is possible to set the ratio of powerful swirl period and mild swirl period or the ratio of powerful swirl period and still period appropriately in accordance with the volume of water or the amount of laundry, thereby damage to laundry cloth is alleviated and unnecessary electricity consumption is avoided.

According to the present invention, a washer, wherein "rinsing with pouring water" is possible, is so configured that antimicrobial metal ions can be added into water being fed during "rinsing with pouring water." With this configuration, during the "rinsing with pouring water," a concentration of the metal ions in water does not decrease, and necessary amount of the metal ions is attached to laundry.

According to the present invention, a washer, wherein antimicrobial metal ions can be added into water in a predetermined process in a laundry washing session, is so configured that when uneven spreading of laundry is detected during squeezing rotation of a washing tub after addition of metal ions, a countermeasure to be adapted is different from that when such uneven spreading of laundry is detected while no metal ions are added. With this configuration, when uneven spreading of laundry is detected while rotating for squeezing after the metal ions are added, it is possible to correct uneven spreading of laundry, taking the antimicrobial effect of the metal ions into consideration.

According to the present invention, in the washer configured as described above, the different countermeasure is rinsing for correcting uneven spreading of laundry by agitating it in water containing metal ions. With this configuration, in case where the rinsing for

CLAIMS

1. A washer wherein antimicrobial metal ions can be added in to water in a predetermined process in a laundry washing session,

5 wherein a time of the predetermined process is longer when metal ions are added than when no metal ions are added.

2. A washer wherein antimicrobial metal ions can be added in to water in a predetermined process in a laundry washing session,

10 wherein the predetermined process includes a powerful whirl period and a mild swirl period or a powerful swirl period and a still period.

3. The washer according to claim 2,

15 wherein a ratio of powerful swirl period and mild swirl period or a ratio of powerful swirl period and still period is constant, regardless of a volume of water in a washing tub and/or an amount of laundry.

4. The washer according to claim 2,

20 wherein a ratio of powerful swirl period and mild swirl period or a ratio of powerful swirl period and still period varies in accordance with a volume of water in a washing tub and/or an amount of laundry.

5. A washer wherein "rinsing with pouring water" is possible,

wherein antimicrobial metal ions can be added into water being fed during "rinsing

with pouring water.”

6. A washer wherein antimicrobial metal ions can be added in to water in a predetermined process in a laundry washing session,

5 wherein when uneven spreading of laundry is detected during squeezing rotation of a washing tub after addition of metal ions, a countermeasure to be adapted is different from that when uneven spreading of laundry is detected while no metal ions are added.

7. The washer according to claim 6,

10 wherein the different countermeasure is rinsing for correcting uneven spreading of laundry by agitating it in water containing metal ions.

8. The washer according to claim 7,

15 wherein in case where the rinsing for correcting uneven spreading of laundry is executed with fresh water being replenished, an amount of metal ions to be added is less than that added in previous processes.

9. The washer according to claim 6,

20 wherein the different countermeasure is rinsing for correcting uneven spreading of laundry by agitating it in water containing no metal ions with indication and/or notification that water being fed contains no metal ions.

10. The washer according to claim 6,

wherein the different countermeasure is termination of squeezing rotation together

with indication and/or notification that uneven spreading of laundry is detected.

11. The washer according to claim 6,

wherein when detection of unbalance in laundry is not a single occasion, different
5 countermeasures are adapted for each occasion.

12. The washer according to claim 6,

wherein a plurality of kinds of countermeasures for unbalance are provided, and
kinds and/or order of countermeasures to be adapted are selectable.

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13. The washer according to claim 11,

wherein a plurality of kinds of countermeasures for unbalance are provided, and
the kinds and/or order of countermeasures to be adapted are selectable.

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14. The washer according to one of claims 1 through 13,

wherein metal ions are generated by using an ion eluting unit that elutes metal ions
by applying a voltage between electrodes.